

# Nutrient Criteria

Region 8 Tribal  
NPS Workshop  
September 12-14, 2006

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## Nutrients: Nitrogen and Phosphorus

- Usually not worried about direct toxicity\*
- Nutrients can result in:
  - Excessive plant and algal growth
  - Oxygen depletion
  - Loss of water clarity
  - Loss of biodiversity
  - Odors and off-flavor of drinking water



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## Sources of Nutrients

- Fertilizers
- Wastewater
- Detergents
- Animal wastes
- Legume crops
- Sediment-bound nutrients
- Atmospheric deposition
- Natural nutrients from geology/ soils/ groundwater

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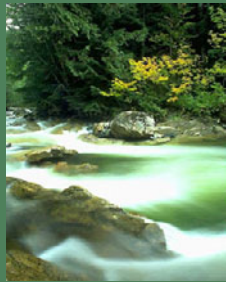
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## Nutrient Problems in the West

- N is often “limiting” in the West
- DO depletion is rare in high gradient waters but common in small, low gradient streams
- Direct toxicity of  $\text{NH}_3$  and  $\text{NO}_3^-$
- Growth of diatoms, filaments



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## Do States / Tribes Have Nutrient Criteria?

- Nutrient standards are usually narrative
  - “There shall be no increase in total P above *background conditions* that may contribute to the acceleration of eutrophication....”
  - “Waters will be “free from” nuisance algae...”
  - “No harm to fish and aquatic life”
  - “Don’t cause toxic conditions”
- Need measurable, numeric interpretations

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## EPA's Response: National Nutrient Strategy

- US EPA will develop nutrient criteria
  - (Federal Register, 40 CFR Part 242 Vol. 63, No. 129 36742-36806)
- 1996 EPA National Nutrient Assessment Workshop concluded that:
  - A single set of national nutrient criteria is not realistic.
  - Nutrient criteria should be developed on a regional or watershed basis.

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## National Nutrient Strategy

### Objectives

- Regional, waterbody-specific approach
- Waterbody-specific technical guidance
- Nutrient Assessment Teams
- Regional Target Endpoints
- Management and Monitoring

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## National Nutrient Strategy

### Default Criteria

- STORET Legacy data to 1988, augmented
- Stratify by waterbody type
  - Streams            – Reservoirs
  - Lakes             – Estuaries
- Stratify by 14 Nutrient Ecoregions

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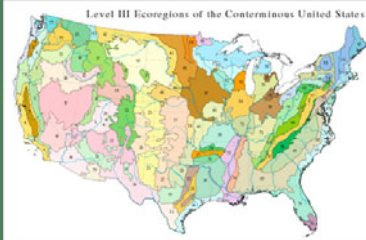
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## National Nutrient Strategy

### Initial Framework

- 14 “Nutrient Regions” (US EPA 1998)
- Aggregation of Level III Ecoregions (Omernik, 1987)




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### Draft Aggregations of Level III Ecoregions for the National Nutrient Strategy



### Initial Framework

- Takes into account:
  - Geomorphology
  - Hydrology
  - Soils
  - Climate
  - Land use

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## EPA 304(a) Criteria\*

(<http://www.epa.gov/waterscience/criteria/nutrient/ecoregions/rivers/index.html>)

### Aggregate Ecoregions Lakes and Reservoirs

Parameter	Agg Ecor I	Agg Ecor II	Agg Ecor III	Agg Ecor IV	Agg Ecor V	Agg Ecor VI	Agg Ecor VII	Agg Ecor VIII	Agg Ecor IX	Agg Ecor X	Agg Ecor XI	Agg Ecor XII	Agg Ecor XIII	Agg Ecor XIV
TP µg/L	0.75	17.00	20.00	20.00	37.5	14.79	8.00	20.00	0.00	10.00	17.50	8.00		
TN mg/L	0.10	0.40	0.44	0.56	0.76	0.66	0.24	0.38	0.46	0.55	1.2	0.35		
Chl a µg/L	1.90	3.40	2.00	2.30	8.88	2.68	2.48	4.93	2.79	2.60	12.30	2.90		
Secchi (m)	4.50	2.70	2.00	1.30	1.30	1.30	4.00	1.50	2.90	2.10	10.70	4.50		

### Aggregate Ecoregions for Rivers and Streams

Parameter	Agg Ecor I	Agg Ecor II	Agg Ecor III	Agg Ecor IV	Agg Ecor V	Agg Ecor VI	Agg Ecor VII	Agg Ecor VIII	Agg Ecor IX	Agg Ecor X	Agg Ecor XI	Agg Ecor XII	Agg Ecor XIII	Agg Ecor XIV
TP µg/L	47.00	10.00	21.88	23.00	67.00	78.23	33.00	10.00	36.56	125	10.00	40.00	31.25	
TN mg/L	0.31	0.12	0.38	0.56	0.86	2.18	0.54	0.38	0.68	0.76	0.3	0.90	0.7	
Chl a µg/L	1.80	1.08	1.78	2.40	3.00	2.70	1.50	0.80	0.90	2.10	1.6	0.40	0.70	
Turb FTU	4.25	1.30	2.34	4.21	7.80	6.30	1.70	1.30	5.70	17.50	2.30	1.90	0.94	
NTU														

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## The EPA Numbers Provide A Starting Point

- We recommend using these values as a threshold for assessing nutrient impacts for non-point source projects, 106 programs, etc.
- They provide a starting point and can be revised with additional data.
- The 304(a) values “wet your whistle” to develop nutrient criteria.



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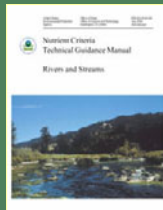
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## National Nutrient Strategy

### Guidance Documents

- Lakes (2000)
- Streams and Rivers (2000)
- Estuaries and Near-coastal (2001)
- Wetlands (2006); Draft Available



- <http://www.epa.gov/waterscience/criteria/nutrient/guidance/index.html>

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## Response to EPA's Values

- Lukewarm
- The values provide a starting point; however most states / tribes have preferred to develop their own nutrient numbers
- Concerns re. implementation issues (i.e., implications for POTWs, etc.) have slowed the pace of nutrient criteria development
- Most states are pursuing a combination of a reference-based approach and stressor - response

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## Nutrient Criteria Next Steps



- States / tribes determine nutrient criteria needs
- States / tribes develop a plan for development and adoption of nutrient criteria
  - data collection and analysis
  - staffing and resources
  - administrative procedures
- States / tribes implement plan and adopt quantifiable nutrient criteria

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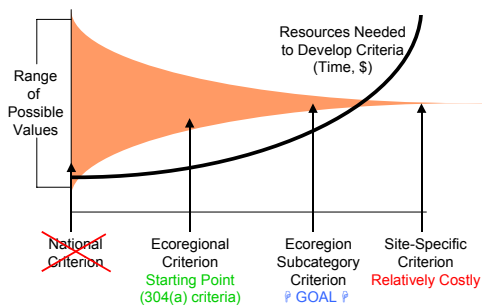
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## Geographic Scales of Nutrient Criteria Development



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## Guidance for States/ Tribes to Develop Nutrient Criteria

- Reference approach
  - compare nutrient distributions between reference and impaired streams
- Stressor – Response
  - examine relationships between nutrients and biomass or biota (e.g. sensitive taxa)
- Literature values/Thresholds
  - use published nutrient level as threshold provided stream shares characteristics of the systems from the literature
- Weight of Evidence Approach

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## Status of Nutrient Criteria Development Plans

- 45 States have nutrient criteria plans (27 plans have reached “mutual agreement” between EPA and state)
- 1 Territory and 5 Tribes have commitments to developing nutrient criteria, but not plans
- 1 State and 3 Territories have adopted numeric nutrient standards
- >26 states/territories have some numeric nutrient criteria adopted for some water

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## Tribal Nutrient Criteria

- Nationally, several tribes are actively working on developing nutrient criteria:
  - Yakama Tribe (Region 10)
  - Hoopa Tribe (Region 9)
  - Fond du Lac (Region 5)
  - Grand Portage (Region 5)
- Mole Lake's (Region 5) adopted EPA's 304(a) criteria.

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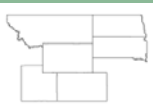
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## Region 8 Status

- Montana has preliminary statewide nutrient thresholds for streams / rivers
- South Dakota has lake / reservoir Trophic Status Index values
- Colorado has some site-specific values for reservoirs (i.e., Dillon)
- Utah is expected to have preliminary statewide values for streams / rivers in 2007

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## Region 8 Nutrient Criteria: Tribal Status

- Tribe must have TAS for 303(c) activities [Water Quality Standards Authority]:
  - CSKT
  - Northern Cheyenne
  - Ute Mountain Ute
  - Fort Peck
- Two tribes in Region 8 have EPA-approved tribal water quality standards (Fort Peck, CSKT) but have not developed numeric nutrient criteria

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## Support for Developing Nutrient Criteria

- EPA has developed a Nutrient Technical Support Center (NSTEPS):
  - Focused on technical support to States/Tribes/Territories
  - Administered with contractor support (TetraTech)
  - Designed to facilitate information exchange
  - Support provided web interactions, with additional help as needed and available

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## What's Currently Available N-STEPs



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## What's Currently Available N-STEPS



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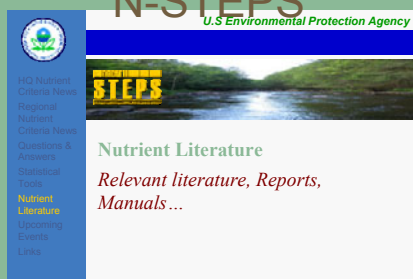
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## What's Currently Available N-STEPS



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## What's Currently Available N-STEPS



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## Questions?

- Contact Tina Laidlaw (Region 8 Nutrient Coordinator) for more information:
  - 406-457-5016
  - [Laidlaw.tina@epa.gov](mailto:Laidlaw.tina@epa.gov)



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